Sunny South Vegetation Report

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Stand Examination, Diagnosis, and Analysis Methods

This analysis used four primary sources for the underlying assessment:

1.   Field reconnaissance of the project area.

2.   Simple plot sampling of random stands stratified by whether or not the stand was in or out of a Home Range Core area and type of marking needed (IE: DxP or Leave Tree Mark (LTM)). All stands designated for LTM received individual prescriptions and marking guides.

3.   Previous fire history of the area as recorded in the TNF GIS layers.

4.   The vegetation and digital ortho-photographic layers associated with the Geographic Information System (GIS) at the Tahoe National Forest.

Field reconnaissance and plot data was collected by Tahoe National Forest Silviculture and Vegetation Management Staff. Walkthroughs of the treatment unit were conducted to evaluate and validate stand conditions and appropriate silvicultural treatment options, keeping project design and desired future condition in mind. All stands proposed for treatment were visited and evaluated for treatment needs and limitations.

Vegetative stands within the project area were randomly sampled to quantitatively describe effects to forest vegetation. Forest inventory data (stand exam) was collected based on select stands identified for treatment. The examination data was processed using the USFS Field Sampled Vegetation Database (FSVeg) and Common Stand Exam (CSE) Program (USDA Forest Service, 2005). Stand exams were performed using several sub-plots established from a common plot center. Averages presented for the project are weighted by area.

Forest Vegetation Simulator (Fvs)

Silvicultural treatments for the Proposed Action and alternatives were analyzed using the Forest Vegetation Simulator (FVS) program (USDA Forest Service, 2003, Revised 2006) to portray and provide information for the existing condition and aid in analyzing and predicting the immediate, short and long-term effects of the alternatives for selected vegetation attributes. FVS is a distant-independent individual tree growth and yield model. This model uses localized vegetation plot data and regionalized growth and mortality parameters to simulate the growth of trees from the plot data and extrapolate it over time. FVS is calibrated to unique geographic areas with the major tree species as well as the numerical growth and yield calculations for the given geographic area producing individual FVS variants. The FVS variant used for modeling stands in the Sunny South Project Area was the Western Sierra Nevada (WS) version. For the purpose of this project the analysis was done for a thirty year time frame. Modeling outputs are known to have some variation in their modeling processes, and outputs should be evaluated on relative rather than absolute terms.

Assumptions

There are basic assumptions associated with modeling silvicultural prescriptions and stand growth. It is important to understand that parameters describing stand conditions and the underlying growth of stands are outcomes of an empirical growth model (FVS). These outcomes are statistical in nature and are an attempt to represent future stand conditions over time. Outputs from the modeling represent an average of "what" might occur over time and interpretation should consider the modeling a tool in understanding ecological processes. The output data reflects silvicultural assumptions (model's underlying equations) and the variability in the input data. There are inherent uncertainties in the use of these models, especially for projections that are more than a couple of decades into the future. The plot based nature of these models requires that for interpretation, they should only be considered to present an average growth condition (e.g. average expected values per acre or per unit time, rather than actual predicted conditions). Future actual growth and mortality of vegetation is affected by dynamic and stochastic events that cannot be accurately modeled but are instead represented by user presupposed assumptions. Nonetheless, for analysis, the use of these models represents the relative difference between alternatives and a generalized expectation for future conditions.

Assumption 1: The collected inventory plot data statistically represents the current "average" stand condition by vegetative type in the Project Area. Therefore stands that were sampled as part of the stratified sample and later dropped from the proposed action are still modeled for treatment, since they were selected to represent other stands that are still proposed for treatments based on vegetation, size class and density.

Assumption 2: The FVS model and the underlying equations of the Western Sierra Nevada variant statistically represent future tree/stand growth and mortality. The model's output of stand conditions provides a statistically non-biased representation of silvicultural activities and stand conditions over time.

Effects of Proposed Activities

There are no extraordinary circumstances regarding vegetation effects for the proposed project.

IMPACTS OF VEGETATION MANAGEMENT

Overall Impacts

The Sunny South project maximizes the retention of old-growth and large trees, as appropriate for the forest type, to the extent that the trees promote stands that are resilient to insects and disease; and considers the best available scientific information to maintain or restore the ecological integrity, including maintaining or restoring structure, function, composition, and connectivity consistent with Section 8204 of the Agriculture Act of 2014 (Public Law 113-79) amended Title VI of the Healthy Forests Restoration Act of 2003 (HFRA) (16 U.S.C. 6591 et seq.).

In the Sunny South area, both plantations and natural stands proposed for treatment have been identified as at risk to insect mortality due to high levels of competition both from trees and from other competing vegetation which limits available resources for trees to grow and to have strong defensive mechanisms that can reduce successful insect attack. The establishment of plantations following fire related mortality has created a landscape of plantations of approximately the same size and age, which

can exacerbate insect related mortality in this area. Reductions in the number of trees per acre and in competing vegetation would allow desired residual trees to better capture site resources and be more resilient to insect attack, especially in periods of prolonged and severe drought.

Proposed treatments would facilitate stand heterogeneity which could be built upon in future treatments. Based on the overall reduction in stand density and the creation of planted areas where species and size class diversity are increased, it is expected that these stands will be more resilient as they continue to develop. Additional space created around oaks and some individual larger pines would enhance the development and resilience of these trees.

In addition to increased resilience, treatments would be expected to result in the quicker development of large trees, the structure most associated with late seral habitat.

Thinning in the Sunny South plantations, **NOT WITHIN** an HRCA.
For Stand Numbers S1, SP1, SP18, 20-24, SP26 and SP28

Thinning in this area is expected to reduce the number of trees per acre from a current average of 138 trees per acre (tpa) greater than 10 inches diameter at 4.5 feet (dbh) to approximately 71 tpa on average, though this number will vary based on individual stands and within stands. Basal area (ba) would be reduced from a current 216 square feet per acre to 141 square feet per acre. Stand density index (SDI) would be reduced from an average of 319 to 195 within these stands. The limiting density for ponderosa pine in this area is identified as 365 (Oliver, 1995) in pure stands and 541 in mixed stands (FVS Western Sierra Nevada Variant). Stands are identified as at high risk of competition related mortality at above 55% of maximum relative density (Bakke, 1997). This puts current stands at about 87% percent of maximum density for ponderosa pine. Thinning would reduce this value to below 53% for pure ponderosa pine stands, which is identified as the point of full site occupancy. Over time basal area per acre and stand density index would increase with the growth of residual trees, and with the establishment of new trees, which would also increase the number of trees per acre in the future. The type and abundance of future regeneration cannot adequately be predicted due to variability in seed crops and site conditions from year to year. Future treatments would be expected to be needed to maintain lower levels of predicted insect mortality.

Thinning in Sunny South plantations **WITHIN** an HRCA
For Stand Numbers SP4, SP5, SP7, SP8, SP10, SP11, SP15, SP16 and SP19.

Thinning in this area is expected to reduce the number of trees per acre from a current average of 195 trees per acre (tpa) greater than 10 inches diameter at 4.5 feet (dbh) to approximately 93 tpa on average, though this number will vary based on individual stands and within stands. Basal area (ba) would be reduced from a current 266 square feet per acre to 183 square feet per acre. Stand density index (SDI) would be reduced from an average of 404 to 263 within these stands. The limiting density for ponderosa pine in this area is identified as 365 (Oliver, 1995) in pure stands and 541 in mixed stands (FVS Western Sierra Nevada Variant). Stands are identified as at high risk of competition related mortality at above 55% of maximum relative density (Bakke, 1997). This puts current stands at about 110% percent of maximum density for ponderosa pine and many areas are under heavy beetle attack. Thinning would reduce this value to below 72%, which is an improvement but due to the canopy cover

constraints associated with HRCA's is not as low as what is needed. Over time basal area per acre and stand density index would increase with the growth of residual trees, and with the establishment of new trees, which would also increase the number of trees per acre in the future. The type and abundance of future regeneration cannot adequately be predicted due to variability in seed crops and site conditions from year to year. Future treatments would be expected to be needed to maintain lower levels of predicted insect mortality.

Thinning in Sunny South stand BF1 - **WITHIN** an HRCA

Thinning in this area is expected to reduce the number of trees per acre from a current average of 181 trees per acre (TPA) greater than 10 inches diameter at 4.5 feet (dbh) to approximately 84 tpa on average, though this number will vary within the stand. Basal area (BA) would be reduced from a current 263 square feet per acre to 171 square feet per acre. Stand density index (SDI) would be reduced from an average of 397 to 244 within this stand. The limiting density for ponderosa pine in this area is identified as 365 (Oliver, 1995) in pure stands and 541 in mixed stands (FVS Western Sierra Nevada Variant). Stands are identified as at high risk of competition related mortality at above 55% of maximum relative density (Bakke, 1997). This puts this stand at about 73% percent of maximum density for ponderosa pine and many areas are under heavy beetle attack. Thinning would reduce this value to below 45%, which is an acceptable range. Canopy cover will be reduced from 66% to 50% which is acceptable for the HRCA. Over time basal area per acre and stand density index would increase with the growth of residual trees, and with the establishment of new trees, which would also increase the number of trees per acre in the future. The type and abundance of future regeneration cannot adequately be predicted due to variability in seed crops and site conditions from year to year. Future treatments would be expected to be needed to maintain lower levels of predicted insect mortality.

Thinning in Sunny South stand SP 13 - **NOT WITHIN** an HRCA

Thinning in this area is expected to reduce the number of trees per acre from a current average of 301 trees per acre (tpa) greater than 10 inches diameter at 4.5 feet (dbh) to approximately 227 tpa on average, though this number will vary within the stand. Basal area (BA) would be reduced from a current 240 square feet per acre to 167 square feet per acre. Stand density index (SDI) would be reduced from an average of 408 to 289 within this stand. The limiting density for ponderosa pine in this area is identified as 365 (Oliver, 1995) in pure stands and 541 in mixed stands (FVS Western Sierra Nevada Variant). Stands are identified as at high risk of competition related mortality at above 55% of maximum relative density (Bakke, 1997). This puts this stand at about 75% percent of maximum density for ponderosa pine and many areas are under heavy beetle attack. Thinning would reduce this value to below 53%, which is an acceptable range. Canopy cover will be reduced from 64% to 53% which is acceptable for the HRCA. Over time basal area per acre and stand density index would increase with the growth of residual trees, and with the establishment of new trees, which would also increase the number of trees per acre in the future. The type and abundance of future regeneration cannot adequately be predicted due to variability in seed crops and site conditions from year to year. Future treatments would be expected to be needed to maintain lower levels of predicted insect mortality.

Thinning in Sunny South stand SP 12 - **WITHIN** an HRCA

Thinning in this area is expected to reduce the number of trees per acre from a current average of 163 trees per acre (tpa) greater than 10 inches diameter at 4.5 feet (dbh) to approximately 53 tpa on average, though this number will vary within the stand. Basal area (BA) would be reduced from a current 280 square feet per acre to 160 square feet per acre. Stand density index (SDI) would be reduced from an average of 409 to 174 within this stand. The limiting density for ponderosa pine in this area is identified as 365 (Oliver, 1995) in pure stands and 541 in mixed stands (FVS Western Sierra Nevada Variant). Stands are identified as at high risk of competition related mortality at above 55% of maximum relative density (Bakke, 1997). This puts this stand at about 76% percent of maximum density for ponderosa pine and many areas are under heavy beetle attack. Thinning would reduce this value to below 32%, which is an acceptable range. Canopy cover will be reduced from 70% to 50% which is acceptable for the HRCA. Over time basal area per acre and stand density index would increase with the growth of residual trees, and with the establishment of new trees, which would also increase the number of trees per acre in the future. The type and abundance of future regeneration cannot adequately be predicted due to variability in seed crops and site conditions from year to year. Future treatments would be expected to be needed to maintain lower levels of predicted insect mortality.

Thinning in Sunny South stand SP 27 - **NOT WITHIN** an HRCA

Thinning in this area is expected to reduce the number of trees per acre from a current average of 197 trees per acre (tpa) greater than 10 inches diameter at 4.5 feet (dbh) to approximately 63 tpa on average, though this number will vary within the stand. Basal area (BA) would be reduced from a current 310 square feet per acre to 170 square feet per acre. Stand density index (SDI) would be reduced from an average of 461 to 228 within this stand. The limiting density for ponderosa pine in this area is identified as 365 (Oliver, 1995) in pure stands and 541 in mixed stands (FVS Western Sierra Nevada Variant). Stands are identified as at high risk of competition related mortality at above 55% of maximum relative density (Bakke, 1997). This puts this stand at about 85% percent of maximum density for ponderosa pine and many areas are under heavy beetle attack. Thinning would reduce this value to below 42%, which is an acceptable range. Canopy cover will be reduced from 69% to 43% which is acceptable for a non HRCA. Over time basal area per acre and stand density index would increase with the growth of residual trees, and with the establishment of new trees, which would also increase the number of trees per acre in the future. The type and abundance of future regeneration cannot adequately be predicted due to variability in seed crops and site conditions from year to year. Future treatments would be expected to be needed to maintain lower levels of predicted insect mortality

A. **Retention of Old Growth.**

Treatments are designed to retain old growth by limiting tree removal to trees less than 30 inches dbh. Treatments proposed are specifically designed to enhance the retention of old growth by removing competing smaller trees (under 30 inches) within the dripline of any tree greater than 30 inches found within a treatment unit.

B. **2. NFMA FINDINGS**

All treatments proposed under the Sunny South Project have been designed to be consistent with Forest Plan direction as specified in the 2004 SNFPA ROD standards and guidelines for mechanical thinning treatments, including the following:

- All live conifers greater than 30 inches dbh will be retained except where removal is necessary for equipment operability.
- Retain 40% of existing basal area (BA) generally comprised of the largest trees.
- Where avaliable, design projects to retain 5 percent or more of the total treatment area in lower layers composed of trees 6 to 24 inches dbh within the treatment unit.
- Design projects to avoid reducing pre-existing canopy cover by more than 30% within the treatment unit.
- Within California spotted owl Home Range Core Areas, retain at least 50% canopy cover averaged over the treatment unit. Treatment Areas --- are within California spotted owl Home Range Core Areas, and would be thinned to a density that maintains 50% canopy cover on average across the treatment areas.
- Outside of the California spotted owl Home Range Core Areas, and where needed to adequately reduce ladder fuels, provide for safe and efficient equiptment operations, minimize re-entry, design cost efficient treatments, and/or significantly reduce stand density, canopy can be reduced to 40% cover on average within the treatment unit. Treatment Areas --- are located outside of Home Range Core Areas. Canopy cover would be reduced to 40% on average across the treatment areas in order to minimize re-entry, provide for cost efficient treatments, and to reduce stand density. As described earlier in this document, the goal for this project is to have post-treatment conditions that would not necessitate re-entry for 20 year.

The minimum specific management requirements to be met in carrying out projects and activities for the National Forest System are set forth in this section. Under 16 U.S.C. 1604 (g)(3)(E), a Responsible Official may authorize project and activity decisions on NFS lands to harvest timber only where:

1. Soil, slope, or other watershed conditions will not be irreversibly damaged;

Implementation of the proposed action would adhere to Best Management Practices for Protecting Water Quality (BMPs) and Forest Plan standards and guidelines (including RCA guidelines) for protecting soil and water resources. Slopes generally greater than 35 percent would be aerially yarded to avoid impacts to soils on steep ground, and requirements for maintaining soil cover and protecting streams would be followed. Best Management Practices and Riparian Conservation Area Guidelines for the Sunny South Project are included in the project record.

2. There is assurance that such lands can be adequately restocked within five years after harvest;

The areas treated in the Sunny South Project would remain adequately stocked following thinning and follow-up fuels treatments.

3. Protection is provided for streams, stream banks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat; and

Management requirements incorporated into the proposed action are designed to reduce the risk of accelerated erosion and sedimentation due to thinning and fuels treatment activities. The proposed action's Best Management Practices for Protecting Water Quality (BMPs) and the Forest Plan standards and guidelines (including RCA guidelines) for protecting soil and water resources are the primary measures for preventing and mitigating impacts from nonpoint source water pollution, such as fine sediment and changes in water temperature. Consistent with Forest Plan direction, a riparian conservation objective (RCO) analysis has been completed for the proposed action (available in the project record), which demonstrates that proposed harvesting would not seriously or adversely affect water quality or riparian/aquatic conditions.

4. The harvesting system to be used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber.

Harvest system selection was based on resource protection rather than economics. Steeper slopes (those generally over 35 percent) are proposed for aerial yarding to protect soil productivity and water quality. Ground based harvesting is less expensive and allows treatments to be more economical compared to aerial yarding.

A Responsible Official may authorize project and activity decisions on NFS lands using clearcutting, seed tree cutting, shelterwood cutting, and other cuts designed to regenerate an even-aged stand of timber as a cutting method. None of the treatments proposed for the Sunny South Project are designed to regenerate even-aged stands of timber.

Works Cited

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